

Avium, 1850, i. p. 513), though subsequently (Cat. des Ois. d'Eur. 1856, p. 4) he refers to it as the young of *Carpodacus erythrinus*.

Mr. Rowley's specimen, which I now offer for your inspection, seems to me without doubt to be a female of the common Greenfinch (*Chlorospiza chloris*), but is distinguished from the ordinary type by an entire absence of yellow colouring, which is replaced by nearly pure white, and the whole bird is generally of a paler hue. One or two friends to whom I have shown it are inclined to suppose it a hybrid between the Greenfinch and the Common Linnet (*Linota cannabina*); but of such an origin I perceive no indication either in the plumage or structure.

Now Dr. Jaubert, who is without doubt a naturalist peculiarly fitted to form an opinion on the subject, has stated—I may almost say, proved—that at least the male of the so-called *Fringilla incerta* is a curious variety, probably caused by confinement, of *Carpodacus erythrinus* (Rev. Zool. 1853, p. 109; 1856, p. 66); and his view of the case has been endorsed by Dr. Gloger (Journ. f. Orn. 1856, p. 313). It is certainly not for me, who know very little about the matter, to question his solution; but Prince Bonaparte is also no mean authority, and his so long referring the *Fringilla incerta* to the group *Chlorospiza*, rather than to *Carpodacus*, must not be forgotten. It appears, then, to me that the only way of reconciling these conflicting opinions is by the supposition that this *Fringilla incerta*, which has caused so much perplexity to ornithologists, has been made up of the abnormal plumages of two species,—the male being founded, as Dr. Jaubert says, on *flavescent* (if I may coin a word wanted to express a variation not uncommon in many classes of animals) examples of *Carpodacus erythrinus*, and the female, as I have here suggested, on under-coloured specimens of *Chlorospiza chloris*.

P.S. 5th May, 1862.—If uncertainty of opinion be ever allowed to a naturalist, perhaps it is pardonable in the case of *Fringilla incerta*. Since I communicated the foregoing conjecture to the Society, I have had an opportunity of examining Prince Bonaparte's great work the 'Fauna Italica.' I must honestly confess that the bills of both the birds represented in plate 38 have the convex character peculiar to the genus *Carpodacus*. Under these circumstances, I can only say that my supposition must go for what it is worth, which I fear may be very little; and I trust to the ornithologists of the south of Europe to clear up the matter more fully, by examining any specimens that may be contained in Prince Bonaparte's collection.

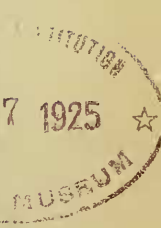
3. ON THE CRANIAL BONES OF LEPIDOSIREN ANNECTENS.

BY T. SPENCER COBBOLD, M.D., F.L.S., ETC.

(Plate XIII.)

The conformation of the skull of *Lepidosiren* is exceedingly peculiar, not only as regards its general outline and construction, but also

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in respect of the individual elements of which it is composed. Three, or at most four, bones enclose the cranial cavity; whilst four others form the face, two being concerned in the formation of the jaws. Besides these there are several osseous appendages, including the hyoid apparatus.

Commencing from behind forwards we find two lateral occipital bones (A, fig. 1), forming the posterior part of the cranial vault. From the side they exhibit a triangular outline; but their bases converge internally so as to form part of the floor of the cerebral cavity. At the middle line below, they unite, leaving, however, a small central interspace, through which may be seen the posterior part of the sphenoid bone; on this latter the occipitals rest. Intimately connected with the posterior border of these occipitals are two vertebral laminae (B) supporting a single neural spine (C); and immediately behind these there are two other laminae (D), surmounted by a double neural spine (E, E). All these elements rest upon the posterior part of the sphenoid bone, which may be looked upon as an ossified prolongation of the chorda dorsalis.

Opposite the point of union between the lateral occipitals and the sphenoid we find two remarkable appendages (F, F). These rib-like elements project obliquely backwards on either side, and form cylindrical rods, having a tolerably uniform thickness throughout. Notwithstanding the objections which may be raised, I am inclined to regard these bones as cranial ribs. They are placed above and behind the clavicular arch; and, as Bischoff remarks in *Lepidosiren paradoxa*, it is clear from their articular connexions that they cannot be regarded as styloid processes.

The sphenoid bone (G), seen from below (fig. 3), is spatulate. With the exception above mentioned, it forms the entire floor of the cranial cavity. It is concave at the anterior half, both above and beneath, and, consequently, also channeled out on either side. The posterior narrow end is convex inferiorly, where it likewise displays a T-shaped groove for the partial lodgement of the aorta. The sphenoid is relatively longer, and terminates more abruptly in front, than the corresponding bone in *Lepidosiren paradoxa*.

The vault of the cranium is also for the most part covered in by a single bone (H). This I believe to consist simply of the two conjoined parietals; but Bischoff thinks the frontals are likewise included in the mass. The appearance of the bone very strongly militates against this latter view, inasmuch as two ossific centres are clearly discernible at the anterior third on either side, and from these two points the osseous spiculæ radiate in all directions. Descriptively it may be regarded as consisting of three laminae united in the central line, the two lower forming the cranial roof, and the upper and somewhat thicker plate constituting a longitudinal vertical ridge, analogous to the parieto-occipital crest in Carnivora.

If the above view be correct, I think it will be admitted that the singular pair of bones overlapping the parietals can be none other than the frontals (I, I, figs. 1, 2); but Bischoff conjecturally assumes them to be the cheek-bones. That the malar bones should be found

extending as far back as the occiput is certainly not much more astonishing than that the frontals should do so. Anyhow, this singular disposition of parts is altogether unique; but in determining these elements to be frontals I am again guided by the centres of ossification, and especially also by the relative position of the bases of the bones. In this situation it will be noticed that they are conjoined in the middle line, whilst their lateral margins in front are directed at first outwards so as to form the upper part of the incomplete orbital ring. Viewed as a whole, these bones have been justly compared to a pair of horns; and their presence, more than any other of the osseous elements, imparts to the skull its unique character. It should be mentioned that the under surface of each bone presents near the inner border a well-defined longitudinal ridge, evidently for the firm attachment of the masseto-temporal muscles.

Immediately in front of the foregoing, there occurs a solitary bone having the form of an isosceles triangle, whose base is connected by ligaments with the anterior margin of the combined frontals. This bone (K, figs. 1, 3) is regarded by Natterer and Bischoff as the representative of the intermaxillary—their opinion being grounded on the circumstance of its supporting a pair of incisive teeth (L) at its anterior inferior surface. It is impossible, perhaps, to speak confidently on this point; but I may observe that the teeth in question are not actually implanted in this bone, but are moveably connected with it by ligamentous substance. I regard this fibrous matrix as homologous with the absent incisive elements (or intermaxillaries); whilst the triangular bone from which the teeth depend is the conjoined nasals. I find no trace of the transverse suture described by Bischoff as occurring in *Lepidosiren paradoxa*; but the tip of the bone in front and above is marked by a well-defined oval surface, roughened for the attachment of the thick cranial fascia.

Below the above we find a remarkable bone, which, at first sight, appears to be the upper jaw (M). Functionally, indeed, as acting in antagonism with the lower jaw, it may be so regarded; but morphologically and homologically it is clearly referable to the associated palatine bones, which are here of enormous size, intimately blended in front, and widely separated behind. Either division is extended in front so as to form three tooth-like projections, each of which is protected by a thick coating of enamel, the whole constituting a dental apparatus of the most formidable character. In the closed condition of the mouth these teeth become dove-tailed with the interspaces resulting from the similarly formed dentition of the jaw properly so called, the anterior palatine tooth-processes being then placed anterior to the corresponding dentations of the lower jaw. This arrangement is very peculiar; and its singularity is not lessened by the circumstance that the incisive teeth, above alluded to, have no antagonists. The true maxillary bones have no existence—a defect which, as Müller and Bischoff observe, also obtains in *Proteus*. The lip-cartilages, described by the latter author as occurring in *L. paradoxa*, I have not found to be present in this species.

The jaw proper (N) consists of several elements, as in reptiles

generally, three at least of these portions being recognizable, namely, the *dental*, *angular*, and *articular*. The anterior and posterior mental spines are conspicuously developed, the line of suture of the two halves of the jaw being entirely obliterated. As in the similar palatine dentition, the enamelled coverings of the teeth are not structurally connected in the middle line.

The *zygomatic* or *jugal* bone (O), to which the lower jaw appears to be exclusively articulated, is here very fully developed. This is the *os quadratum* of birds. The anterior inferior end is hollowed out for the reception of the articular process of the jaw, the upper portion being flat and directed inwards so as partly to overlap the border of the sphenoid.

Immediately below the above are two small osseous appendages, which Bischoff regards as opercular bones. The superior one (P) is styliform, and, from its position, seems to me to represent the *symplectic* bone, hitherto supposed to be peculiar to fishes. The inferior bone (Q) is comparatively broad, and by its position appears to correspond with the pre-opercular bone of the same class. Behind, below, and in ligamentous union with these bones, the hyoid apparatus (R) is connected. It here consists simply of two large, converging, curved cylinders, slightly flattened at either end, and which, stretching forwards and downwards, unite together anteriorly in the middle line. Bischoff calls them, taken together, the tongue-bone; but it appears to me that the two divisions are homologous with the *apophyses*, or anterior cornua of the hyoid.

4. ON THE SITUATION, FORM, AND CAPACITY OF THE GALL-BLADDER IN THE VERTEBRATA; ON ITS ABSENCE IN CERTAIN ANIMALS; AND ON THE COLOUR OF THE BILE. BY EDWARDS CRISP, M.D., F.Z.S., ETC.

In 1853 I read a paper at the London Physiological Society upon the Bile and Gall-bladder, but at that period my experience was comparatively limited. A very short abstract only of this communication was published in the 'Lancet' and 'Medical Times,' 1853.

As mentioned in the charter of this Society, one of the objects of its founders was the cultivation of anatomy and physiology—departments of zoology of much greater importance, as I believe, to the good of mankind than the external characters of animals, or of their too often fanciful division into genera and species. I therefore make no apology for the introduction of the present communication, which is partly physiological.

Every circumstance connected with the secretion, quality, and quantity of the bile—a fluid of such vast importance in the animal economy—must interest the zoologist; and, as I have stated in my papers "On the Causes of Death of the Animals dying in the Society's Collection" ('Proceedings,' 1860, pp. 175, 190) that diseases of the liver, and consequently derangements of the biliary secretion, are very frequent, the investigation, I think, must be profitable to the Fellows